

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 33

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte RAYMOND M. WARNER JR.,  
RONALD D. SCHRIMPE  
and ALFONS TUSZYNSKI

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Appeal No. 95-2440  
Application 07/705,726<sup>1</sup>

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ON BRIEF

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Before WEIFFENBACH, PAK and THIERSTEIN, Administrative Patent Judges.

PAK, Administrative Patent Judge.

DECISION ON APPEAL

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<sup>1</sup> Application for patent filed May 24, 1991. According to appellants, this application is a division of Application 07/443,175 filed November 30, 1989, now U.S. Patent No. 5,089,826 granted February 18, 1992, which is a continuation-in-part of Application 06/861,708 filed May 12, 1986, now U.S. Patent No. 4,885,615 granted December 5, 1989, which is a continuation-in-part of Application 06/799,652 filed November 19, 1985, now U.S. Patent No. 4,794,443 granted December 27, 1988.

Werner et al. (appellants) appeal from the final rejection of claims 46 through 50, 52, 57 through 61, 63 and 72 through 98. Claim 70 stands withdrawn from further consideration as directed to a non-elected invention.

Claims 46, 77, 87 and 97 are representative of the subject matter on appeal and read as follows:

46. A method for fabricating an integrated circuit monolith that is substantially monocrystalline and having parts that are substantially lattice-matched, said monolith being three-dimensional in the sense that it comprises two or more layers of circuitry, said method combining at least the following technologies:

a. sputter deposition of a type-1 semiconductor material by using a type-1 semiconductor target;

b. sputter deposition of a small amount of heavily doped type-2 semiconductor material by using a type-2 semiconductor target;

c. diffusion in selected areas of the type-2 impurity by using incident patterned light;

d. removal of type-2 impurity from nonselected areas by ion milling; and,

e. rapid annealing by using general incident light.

77. Method for fabricating a three-dimensional integrated circuit that is substantially monocrystalline and that comprises a three-dimensional doping pattern achieved by the growth of a sequence of discrete crystal-layer increments, each increment having a two-dimensional doping pattern, said sequence of crystal-layer increments created in a manner such that their successive two-dimensional patterns intersect where

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desired, and through two-dimensional-pattern variations, do not intersect in other regions.

87. Method for fabricating a three-dimensional integrated circuit that is substantially monocrystalline and that comprises a three-dimensional doping pattern achieved by the growth of a sequence of discrete crystal-layer increments, each increment having a two-dimensional doping pattern created by a procedure that comprises at least three of the following five steps:

a. growth by sputter epitaxy of a lightly doped first layer of semiconductor material of a first conductivity type;

b. growth by sputter epitaxy of a heavily doped second layer, thinner than said first layer, of the same semiconductor material and of a second conductivity type;

c. localized diffusion in selected areas of the impurities present in the said second layer into the said first layer by causing patterned light of appreciable intensity to fall on the surface of the said second layer;

d. uniform removal by ion milling of the said second layer, thus removing from nonselected areas essentially all of the impurities associated with the said second layer of a second conductivity type, while leaving these said impurities distributed through the thickness of the said first layer in the said selected areas;

e. thermal annealing of the grown crystal-layer increment by using unpatterned incident light.

97. Method for fabricating a three-dimensional integrated circuit that is substantially monocrystalline and that comprises a three-dimensional doping pattern achieved by the growth of a sequence of discrete crystal-layer increments, each increment having a two-dimensional doping pattern created by a procedure that comprises at least four of the following five steps:

a. growth by sputter epitaxy of a lightly doped first layer of semiconductor material of a first conductivity type;

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b. growth by sputter epitaxy of a heavily doped second layer, thinner than said first layer, of the same semiconductor material and of a second conductivity type;

c. localized diffusion in selected areas of the impurities present in the said second layer into the said first layer by causing patterned light of appreciable intensity to fall on the surface of the said second layer;

d. uniform removal by ion milling of the said second layer, thus removing from nonselected areas essentially all of the impurities associated with the said second layer of a second conductivity type, while leaving these said impurities distributed through the thickness of the said first layer in the said selected areas;

e. thermal annealing of the grown crystal-layer increment by using unpatterned incident light.

The references of record relied upon by the examiner are:

Potts	3,420,719	Jan. 7,
1969		
Curran	4,717,681	Jan. 5,
1988		

(Filed May 19, 1986)

G.K. Wehner, et al. (Wehner), "Substituting low-energy (<30eV) ion bombardment for Elevated Temperature in Silicon Epitaxy," J. Appl. Phys. 64(12), (December 15, 1988), pp. 6754-60.

Stanley Wolf, et al. (Wolf), Silicon Processing for The VLSI Era Vol. 1: Process Technology, (Lattice Press, Sunset Beach, California, 1986), pp. 156-58, and 539-42.

The appeal claims stand rejected as follows:

(1) Claims 46 through 50, 52, 57 through 61, 63 and 72 through 92 under 35 U.S.C. § 112, first paragraph, as lacking

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an adequate written description of the invention, including how to make and/or use the invention, in the specification;

(2) Claims 72 through 92 under 35 U.S.C. § 112, first paragraph, as lacking descriptive support for the invention as is now claimed in the original specification;

(3) Claims 46 through 50, 52, 57 through 61, 63 and 72 through 98 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicants regard as their invention;

(4) Claims 46 through 50, 52, 57 through 61, 63 and 72 through 98 under 35 U.S.C. § 102(a) as being anticipated by appellants' admissions on pages 19 through 21 of the specification; and

(5) Claims 46 through 50, 52, 57 through 61, 63 and 72 through 98 under 35 U.S.C. § 103 as being unpatentable over Curran in view of Wehner, Potts and Wolf.

Having reviewed the entire record, including the specification, claims, prior art, appellants' brief and reply brief, and the examiner's answer, we shall:

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(1) Reverse the rejection of claims 46 through 50, 52, 57 through 61, 63 and 72 through 92 under 35 U.S.C. § 112, first paragraph, based on lack of an adequate written description of the invention, including how to make and/or use the invention, in the specification;

(2) Reverse the rejection of claims 87, 97 and 98 under 35 U.S.C. § 112, second paragraph, based on the indefiniteness of the claim language "appreciable intensity";

(3) Affirm the rejection of claims 75 and 83 under 35 U.S.C. § 112, second paragraph, based on the indefiniteness of the claim language as a whole due to the term "in turn";

(4) Reverse the rejection of claims 46 through 50, 52, 57 through 61, 63 and 72 through 76 under 35 U.S.C. § 103 over the disclosures of Curran, Wehner, Potts and Wolf; and

(5) Remand the application to the examiner to make appropriate findings facts and explanations for the remaining rejections under 35 U.S.C. § 112, first and second paragraphs, § 102 (a) and § 103.

Our reasoning for the above determinations follows.

The examiner has rejected claims 46 through 50, 52, 57 through 61, 63 and 72 through 92 under 35 U.S.C. § 112, first

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paragraph, as lacking an adequate written description of the invention, including how to make and/or use the invention, in the specification. The examiner's position appears to be that the

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specification does not enable one of ordinary skill in the art to make and use the claimed subject matter.

Determination of enablement is a question of law based on underlying factual findings. In re Vaeck, 947 F.2d 488, 495, 20 USPQ2d 1438, 1444 (Fed. Cir. 1991). The examiner has the initial burden of supplying the factual basis to establish unpatentability of the claimed subject matter based on lack of an enabling disclosure. In so doing, the examiner must take into account, inter alia, one skilled in the pertinent art, the application disclosure and information known in the art. In re Wands, 858 F.2d 731, 737, 8 USPQ2d 1400, 1404 (Fed. Cir. 1988); United States v. Telectronics, Inc., 857 F.2d 778, 785, 8 USPQ2d 1217, 1223 (Fed. Cir. 1988).

However, the examiner makes the following conclusory remarks only to justify his or her rejection:

The specification does not describe how to carry out the method of the claimed invention. There is no recitation of necessary growth conditions, doping levels, or interconnect fabrication steps.

These remarks are not only inaccurate, but also did not take into account, among other things, information known in the

art. See, e.g., appellants' entire specification and brief, pages 26-28. We are constrained to reversed this rejection.

The examiner has also rejected claims 87, 97 and 98 as being indefinite for reciting "appreciable intensity". We shall not sustain this rejection.

Although we agree with the examiner that the specification does not provide a specific definition for "appreciable intensity", it is our view that one skilled in the pertinent art would know what is meant by "appreciable intensity" in view of the general guidelines contained in the disclosure, see, e.g., In re Mattison, 509 F.2d 563, 565, 184 USPQ 484, 486-87 (CCPA 1975). This is especially true in the present situation since the claims limit the meaning of "appreciable intensity" to the particular function which is to be achieved, i.e., inducing diffusion. See In re Halleck, 422 F.2d 911, 164 USPQ 647 (CCPA 1970); Ex parte Skuballa, 12 USPQ2d 1570 (Bd. Pat. App. & Int. 1989).

Further, the examiner has rejected claims 75 and 83 as being indefinite for reciting "in turn". We shall sustain this rejection. Although the phrase "in turn" itself is definite, the context in which it is used in the claims

creates indefiniteness. It is our view, one of ordinary skill in the art would not be able to ascertain the intended scope of the claims because the meaning of the expression "means comprising (in turn) ..." is not understood. The expression has not been defined or clarified in appellants' specification.

Moreover, the examiner has rejected claims 46 through 50, 52, 57 through 61, 63 and 72 through 98 under 35 U.S.C. § 103 as unpatentable over the combined disclosures of Curran, Wehner, Potts and Wolf. To the extent the rejection is applied to the claims 46 through 50, 52, 57 through 61, 63 and 72 through 76, we shall not sustain it. Suffice to say that the examiner has not met the burden of establishing a prima facie case of unpatent-ability of the claimed subject matter. See, e.g., the reasons expressed by appellants in their Brief and Reply Brief.

REMAND TO THE EXAMINER

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We remand this application to the examiner with instructions to make appropriate findings of fact and detailed analyses respecting the remaining rejections.<sup>2</sup>

REJECTION UNDER § 112, FIRST PARAGRAPH

The issue of whether an original disclosure adequately describes the subject matter later claimed is a question of fact. Vas-Cath, Inc. v. Mahurkar, 935 F.2d 1555, 1563, 19 USPQ2d 1111, 1116 (Fed. Cir. 1991). This written description requirement serves to ensure that the inventor had possession, as of the filing date of the application relied on, of the specific subject matter later claimed. In re Wertheim, 541 F.2d 257, 262, 191 USPQ 90, 96 (CCPA 1976). The requirement for "possession" does not require literal support in the original disclosure. Eiselstein v. Frank, 52 F.3d 1035, 1038, 34 USPQ2d 1467, 1470 (Fed. Cir. 1995). Rather, it only requires that the original disclosure reasonably conveys to those skilled in the art, as of the filing date, the invention

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<sup>2</sup> If the examiner remains of the opinion that any claim rejected herein is still unpatentable under the same section of the statute, he or she should reopen prosecution so that appellants have a full and fair opportunity to respond.

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now claimed. Vas-Cath, 935 F.2d at 1563-64, 19 USPQ2d at 1117; In re Kaslow, 707 F.2d 1366, 1375, 217 USPQ 1089, 1096 (Fed. Cir. 1983).

The examiner has rejected claims 72 through 92 under 35 U.S.C. § 112, first paragraph, as lacking descriptive support for the invention as is now claimed in the original specification. The examiner then enumerated certain later added claim limitations which are said to have no literal support in the specification. In response, appellants referred to certain descriptions of the original disclosure. See Brief, pages 20 to 26. According to appellants, these descriptions reasonably conveyed the claim limitations in question. However, the examiner did not fully explain why each and every description referred to by appellants did not reasonably convey the claim limitations in question.

Upon return of the application, the examiner is to determine whether each and every description relied upon by appellants reasonably conveys to one of ordinary skill in the art the claim limitations in question within the meaning of § 112, first paragraph.

REJECTION UNDER § 112, SECOND PARAGRAPH

Under the second paragraph of § 112, the examiner may reject claims as being indefinite if they omit essential elements, steps or necessary structural cooperative relationship of elements. See In re Collier, 397 F.2d 1003, 1005, 158 USPQ 266, 267 (CCPA 1968). Not every omission, however, renders the claims indefinite, for they need not recite every detail of patent applicants' process. See In re Johnson, 558 F.2d 1008, 1017, 194 USPQ 187, 195 (CCPA 1977); In re Roberts, 470 F.2d 1399, 1403, 176 USPQ 313, 315 (CCPA 1973); In re Rainer, 305 F.2d 505, 509, 134 USPQ 343, 346 (CCPA 1962). Breadth must not be equated with indefiniteness. In re Miller, 441 F.2d 689, 693, 169 USPQ 597, 599-600 (CCPA 1971).

The examiner has rejected claims 46 through 50, 52, 57 through 61, 63 and 72 through 98 under 35 U.S.C. § 112, second paragraph, as being indefinite. To sustain this rejection, the examiner made the following conclusory remark:

These claims are vague in that they fail to recite specific process fabrication steps necessary to fabricate three dimensional circuits.

This conclusory remark, however, is devoid of any analysis or explanation. Absent an appropriate analysis or explanation,

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the examiner's remark is essentially unreviewable in any meaningful manner.

Upon return of this application, the examiner is to reconsider the entire merits of the rejection consistent with In re Collier, supra, In re Johnson, supra, In re Roberts, supra and In re Rainer, supra. If the examiner remains of the view that claims 46 through 50, 52, 57 through 61, 63 and 72 through 98 are still unpatentable under 35 U.S.C. § 112, second paragraph, the examiner should institute such a rejection. The examiner needs to provide a complete analysis, including statements and/or objective evidence as to why certain fabrication steps are essential.

The examiner has also rejected claims 72 through 76 and 84 under 35 U.S.C. § 112, second paragraph, as being indefinite. The examiner took the position that the terms "repeatedly" and "substantially plane" recited therein render the claims "vague and indefinite." Under the second paragraph of § 112, words used in claims must not be analyzed in vacuum. Rather, they must be read in light of the teachings of the prior art and the application disclosure. In re Moore, 439 F.2d 1232, 1235, 169 USPQ 236, 238 (CCPA 1971). However, the

examiner has not made any findings of fact as to whether the terms in question are described by the original disclosure as indicated supra. Absent such a determination, the examiner could not have taken into account the application disclosure in assessing the definiteness of the terms in question.

Upon return of this application, the examiner is to reconsider the entire merits of this rejection, taking into account descriptive support in the original disclosure, as well as prior art teachings.

PRIOR ART REJECTION UNDER § 102

Anticipation under Section 102 is a factual determination. In re Baxter Travenol Labs., 952 F.2d 388, 390, 21 USPQ2d 1281, 1283 (Fed. Cir. 1991) citing In re Bond, 910 F.2d 831, 833, 15 USPQ2d 1566, 1567 (Fed. Cir. 1990). Anticipation requires prior art to describe, either expressly or under the principles of inherency, each and every element set forth in the claims. See, e.g., RCA Corp. v. Applied Digital Data Sys., Inc., 730 F.2d 1440, 1444, 221 USPQ 385, 388 (Fed. Cir. 1984). The term "prior art" includes an appellants' admission of prior art in a patent application.

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See 37 CFR § 1.106(c); In re Nomiya, 509 F.2d 566, 570-71, 184 USPQ 607, 611-12 (CCPA 1975).

The examiner has rejected claims 46 through 50, 52, 57 through 61, 63 and 72 through 98 under 35 U.S.C. § 102(a) as being anticipated by appellants' admission on pages 19-21 of the specification. The examiner, however, did not indicate what portions of pages 19 through 21 of the "admitted prior art" corresponded to the claimed limitations. Nor did the examiner indicate how "admitted prior art" was established. See, e.g., In re Nomiya, supra for the test for "admitted prior art".

In rejecting the above claims under § 102(a), the examiner acknowledged that they "do not stand or fall together." See Answer, page 2. In other words, the examiner has agreed to treat the claims at issue separately. The examiner, however, did not discuss the limitations of any of the claims at issue. Nor did the examiner discuss any particular portion of "admitted prior art" which supposedly taught each and every claim limitations. All we have is the examiner's general reference to pages 19 through 21 of the specification. It appears that the examiner is asking us to

make a § 102 rejection using pages 19 through 21 of the specification. We must emphasize that it is not the role of the Board of Patent Appeals and Interference to conduct examination in the first instance while an application is on appeal.

Upon return of this application, the examiner is to reconsider the entire merits of the § 102 rejection consistent with our opinion. If the examiner remains of the opinion that the claims are still unpatentable over appellants' admitted prior art, he or she need to make appropriate findings of fact regarding each and every claim limitations.

PRIOR ART REJECTION UNDER § 103

The examiner has rejected claims 46 through 50, 52, 57 through 61, 63 and 72 through 98 under 35 U.S.C. § 103 as being unpatentable over Curran in view of Wehner, Potts and Wolf.

In rejecting the claims, the examiner acknowledged that they "do not stand or fall together." See Answer, page 2. In other words, the examiner has agreed to treat the claims at issue separately. The examiner, however, focused only on the limitations of claim 46. Even when appellants filed a Reply

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Brief arguing for the first time the limitations of certain dependent claims, the examiner allowed entry of the Reply Brief but stated that no response was necessary. As indicated supra, we reverse the rejection to the extent it applies to claims 46 and its dependent claims. With respect to the rejection of claims 77 through 98 under 35 U.S.C. § 103, we cannot review it meaningfully inasmuch as the examiner did not provide any basis for rejecting these claims.

Upon return of this application, the examiner is to consider the entire merits of the § 103 rejection of claims 77 through 98. The examiner should review the prior art references and the claims at issue to determine whether a § 103 rejection is warranted. If warranted, the examiner need to make appropriate findings of fact and appropriate analyses.

This application, by virtue of its "special" status, requires an immediate action, MPEP 708.01(d). It is important that the Board be informed promptly of any action affecting the appeal in this case.

Appellants are advised that the effective date of our affirmance is suspended or tolled until conclusion of prosecution before the examiner on remand. This will preserve

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appellants' right to file a timely request for reconsideration of our decision and/or to seek review under 35 U.S.C. §§ 141 or 145 respecting the affirmed rejections.

If further prosecution before the examiner does not result in allowance of the application, abandonment, or a second appeal, this case should be returned to the Board for final action on the affirmed rejections, including any timely request for reconsideration thereof.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR 1.136(a).

AFFIRMED-IN-PART  
and REMANDED

	CAMERON WEIFFENBACH	)	
	Administrative Patent Judge	)	
		)	
		)	
	CHUNG K. PAK	)	BOARD OF
PATENT	Administrative Patent Judge	)	APPEALS
		)	AND

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INTERFERENCES )  
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JOAN THIERSTEIN )  
Administrative Patent Judge )  
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